REMARKS

Present Status of the Application

The Office Action objects specification and claims 6 and 11. The Office Action rejected claims 1-13 under 35 U.S.C. 102(a) as being anticipated by Fujita et al. (US 2003/0085994; hereinafter Fujita). Applicant has amended specification and claims to correct typographic errors. After entry of amendments, claims 1-13 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Discussion of Claim Rejections under 35 USC 102

The Office Action rejected claims 1-13 under 35 U.S.C. 102(a) as being anticipated by Fujita. Applicant respectfully traverses the rejections for at least the reasons set forth below.

1. The present invention, as for example shown in FIG. 3 or FIG. 4, includes the third transceiver 224, which is used to ***wirelessly*** transmit the image data to the image processor 230 or the fourth transceiver 250. ***It should be noted that the transmission between the image processor 230 and the data recorder 220 is wireless manner.*** In this structure, the image data in the data recorder 220, which is usually carried with the patient at the remote distance, can be transmitted to the image processor 230 for displaying. In the invention, the image processor 230 can receive the image data from the data recorder 220 at anytime when the trigger 260 at the image processor 230 is activated, even when the endoscope 210 is still taking data and transmitting the data to the data recorder 220. The present invention can improve the medical operating efficiency in time in comparing with Fujita.

In other words, the wireless manner of the present invention between the data recorder 220 and the image processor 230 allows the image data to be transmitted to the image processor 230 without physical connection in the conventional manner or in the Fujita.

The foregoing features are at least recited in independent claims 1 and 7.

In addition, according to the third transceiver, the image data stored in the data recorder can be ***wirelessly*** and immediately transmitted by the third transceiver [0027]. This can solve the issues as mentioned in FIG. 1 and FIG. 2 [0006]. These features are further recited in added claims 12-13.

Claims 3, 5, 9 and 10 recite that the image data can also be ***wirelessly*** transmitted by triggering manner. In combining trigger and wireless, the image data can be downloaded to the image processor immediately under triggering or on-demand.

2. In re Fujita, Fig. 1A and Fig. 1B disclose the system, similar to the descriptions in FIG. 1 and FIG. 2 of the present invention. The external unit 5 is necessarily brought back and disposed in the cradle 6, and electrically connected to the terminal device 7 [0048] for displaying the images taken by the endoscope 3. In other words, ***the external unit 5 transmits the image data to the terminal device 7 in electrical and physical connection.*** Basically, Fujita is nothing more than the descriptions in FIG. 1 and FIG. 2 of the present invention, and has the disadvantages.

In further detail, Fujita (Abstract; [0075]) is to save the power consumption of battery in the capsule-type endoscope 3, so that a proper radio transmission power can be set via the four antennas 11a - 11d, wherein the radio wave strength data is detected first on the capsule side.

Basically, Fujita never considers the issue of the present invention between the data recorder and the image processor, and never provides the solution of the issue considered by the present invention.

Therefore, Fujita at least fails to disclose the wireless features of the third transceiver of the present invention, in wireless manner, to transmit the image data to the image processor, as recited in independent claims 1 and 7.

Further, Fujita has to wait until the external unit 5 has completely collected the data, then downloads the data into the computer subsystem by physical connection. In this way, the image data cannot be immediately transmitted by triggering, when the capsule-type endoscope 3 is still taking data. Also, the image data in Fujita cannot be transmitted by a trigger (or on-demand) while the endoscope is still in the digestive tract. Fujita failed to disclose the features recited in claims 3, 5, 9, 10, and 12-13.

For at least the foregoing reasons, Applicant respectfully submits that independent claims 1 and 7 patently define over the prior art, and should be allowed. For at least the same reasons, dependent claims 2-6 and 8-13 patently define over the prior art references as well.

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CONCLUSION

For at least the foregoing reasons, it is believed that all the pending claims 1-13 of the invention patently define over the prior art and are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,
J.C. PATENTS

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Jiawei Huang
Registration No. 43,330

4 Venture, Suite 250
Irvine, CA 92618
Tel.: (949) 660-0761
Fax: (949)-660-0809

SUBSTITUTE SPECIFICATION (Marked Copy)

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CAPSULE TYPE ~~ENDOSCOPY~~ENDOSCOPE SYSTEM FOR PROMPT IMAGE-DOWNLOAD BY TRIGGER

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a capsule type ~~endoscopy~~endoscope system, and more particularly to a capsule type ~~endoscopy~~endoscope system immediately transmitting the images of a digestive tract to[[~~a~~]] display.

Description of the Related Art

[0002] Vessel diseases, digestive diseases and cancers are the main concerns for human being. Traditionally, endoscopies have been widely used for observing the digestive system in medical treatments. However, the endoscopies cannot catch all the images in the digestive system, such as small intestines. ~~More~~Even worse, patients do not feel comfortable during the medical processes. In order to [[~~resolve~~]]solve the problems, capsule type endoscopies have been widely used in the industry.

[0003] FIGS. 1 and 2 are transmission configuration of the prior art capsule type ~~endoscopy~~endoscope system. Referring to FIGS. 1 and 2, the prior art capsule type ~~endoscopy~~endoscope system 100 comprises: a capsule type ~~endoscopy~~endoscope 110, a data recorder 120, an image processor 130 and a display 140. Generally, the capsule type ~~endoscopy~~endoscope 110 includes a capsule [[~~type~~]]shell, an image sensor, a light emitting diode and an Ag_2O cell. In the prior art capsule type ~~endoscopy~~endoscope system 100, the capsule type ~~endoscopy~~endoscope 110 has a transmitter 112, and the data recorder 120 has a receiver 122 and a memory 124.

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[0004] After being swallowed by a patient, the capsule type ~~endoscopy~~endoscope 110 catches the image of the patient's digestive tract, and transmits the image data to the receiver 122 of the data recorder 120 via the transmitter 112. Then the image data is processed and stored in the memory 124.

[0005] Referring to FIGS. 1 and 2, after the data transmission and storage thereof, the data recorder 120 is wirelined to the image processor 130. The image processor 130 accesses the image data from the memory 124 for displaying the images for medical treatments.

[0006] From FIGS. 1 and 2, the prior art method includes two stages. In the first stage, the capsule type ~~endoscopy~~endoscope catches, transmits and stores the image of the digestive tract. In the second stage, the image data is accessed and displayed. Because it takes about 8 hrs for the capsule type ~~endoscopy~~endoscope going through the digestive tract, the image data thereof cannot be caught immediately by the image processor 130. In other words, the prior art capsule type ~~endoscopy~~endoscope system cannot output image data from the data recorder 120 to the image processor 130 during the first stage and has to wait until the capsule type endoscope 110 has finished the data taking process, then transmits all the data to the data recorder 120~~until it is finished~~. ~~After~~Only after the first stage is finished, the image data then can be displayed on the display 140.

SUMMARY OF THE INVENTION

[0007] Therefore, an object of the present invention is to provide a capsule type ~~endoscopy~~endoscope system, which can transmit[[~~transmits~~]] the image of the digestive

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tract to the image processor immediately by triggering and display the image on the display for medical treatments.

[0008] The other object of the present invention is to provide a capsule type ~~endoscopy~~endoscope system, which transmits the image of the digestive tract to the image processor immediately via the transceivers triggered by the data recorder or the image processor thereof.

[0009] To achieve the objects above, the present invention discloses a capsule type ~~endoscopy~~endoscope system, adapted to transform an image of a digestive tract into an image data and to transmit the data, which comprises: a capsule type ~~endoscopy~~endoscope, a data recorder and an image processor. The capsule type ~~endoscopy~~endoscope has a first transceiver, wherein the capsule type ~~endoscopy~~endoscope is adapted to catch the image of the digestive tract and to transform the image into the image data. The data recorder has a second transceiver, a third transceiver and a memory, the second and the third transceivers coupled to the memory. Notably, the first transceiver of the capsule type ~~endoscopy~~endoscope transmits the image data to the second transceiver of the data recorder, which is stored in the memory and transmitted to the image processor by the third transceiver. In addition, the image processor above further comprises a fourth transceiver, adapted to receive the image data from the third transceiver.

[0010] To achieve the objects above, the present invention discloses a capsule type ~~endoscopy~~endoscope system, adapted to transform an image of a digestive tract into an image data and to transmit the data, which comprises: a capsule type ~~endoscopy~~endoscope, a data recorder, a fourth transceiver and an image processor coupled to the fourth transceiver. The capsule type ~~endoscopy~~endoscope has a first

transceiver, wherein the capsule type ~~endoscopy~~endoscope is adapted to catch the image of the digestive tract and to transform the image into the image data. The data recorder has a second transceiver, a third transceiver and a memory, the second and the third transceivers coupled to the memory. Notably, the first transceiver of the capsule type ~~endoscopy~~endoscope transmits the image data to the second transceiver of the data recorder, which is stored in the memory and transmitted to the fourth transceiver and the image processor by the third transceiver.

[0011] According to the preferred capsule type ~~endoscopy~~endoscope system of the present invention, the transmission between the first and the second transceivers is continuous.

[0012] According to the preferred capsule type ~~endoscopy~~endoscope system of the present invention, the system further comprises a trigger, disposed in the data recorder or the image processor.

[0013] According to the preferred capsule type ~~endoscopy~~endoscope system of the present invention, the transmission between the third and the fourth transceivers is triggered by the trigger.

[0014] According to the preferred capsule type ~~endoscopy~~endoscope system of the present invention, the system further comprises a display coupled to the image processor for displaying the image of the ~~digest~~digestive tract.

[0015] In the capsule type ~~endoscopy~~endoscope system of the present invention, the image of the digestive tract is transmitted from the third transceiver to the fourth transceiver. After the processing of the processor, the image of the digestive tract can be displayed for medical treatment.

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[0016] In order to make the aforementioned and other objects, features and advantages of the present invention understandable, a preferred embodiment accompanied with figures is described in detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] FIGS. 1 and 2 are transmission configuration of the prior art capsule type endosocpy system.

[0018] FIG. 3 is a schematic configuration showing an image data transmission of a preferred capsule type ~~endoscopy~~endoscope system of the present invention.

[0019] FIG. 4 is a schematic configuration showing an image data transmission of another preferred capsule type ~~endoscopy~~endoscope system of the present invention.

DESCRIPTION OF SOME EMBODIMENTS

[0020] FIG. 3 is a schematic configuration showing an image data transmission of a preferred capsule type ~~endoscopy~~endoscope system of the present invention. Referring to FIG. 3, the capsule type ~~endoscopy~~endoscope system 200 is adapted to transform an image of a digestive tract into an image data and to transmit the data. Following are the descriptions of the capsule type ~~endoscopy~~endoscope system 200.

[0021] Referring to FIG. 3, the capsule type ~~endoscopy~~endoscope system 200 comprises: a capsule type ~~endoscopy~~endoscope 210, a data recorder 220 and an image processor 230. The capsule type ~~endoscopy~~endoscope 210 has a first transceiver 212, wherein the capsule type ~~endoscopy~~endoscope 210 is adapted to catch the image of the digestive tract and to transform the image into the image data. Additionally, the capsule type ~~endoscopy~~endoscope system 200 of the present invention further comprises a

display 240 coupled to the image processor 230 for displaying the image of the digestive tract caught by the capsule type ~~endoscopy~~endoscope 210. The capsule type ~~endoscopy~~endoscope 210 can be, for example, a MIA capsule type ~~endoscopy~~endoscope (Given, Isreal), which comprises a light emitting diode, an image sensor, an Ag_2O cell, and a transceiver in a space 30mm*11mm. The capsule type ~~endoscopy~~endoscope 210, for example, catches two images for each second. Of course, the capsule type ~~endoscopy~~endoscope can be any other capsule type endoscopies.

[0022] The data recorder 220 has a second transceiver 222, a third transceiver 224 and a memory 226, the second and the third transceivers 222 and 224, respectively, coupled to the memory 226. Notably, the first transceiver 212 of the capsule type ~~endoscopy~~endoscope 210 transmits the image data to the second transceiver 222 of the data recorder 220. In the embodiment, the transmission between the first and the second transceivers 212 and 222, respectively, is continuous. The image data received by the second transceiver 222 is stored in the memory 226 and transmitted to the image processor 230 by the third transceiver 224.

[0023] In the embodiment, the image processor 230 comprises, for example, a fourth transceiver 240, adapted to receive the image data from the third transceiver 224. Of course, the image processor 230 may, for example, comprise a memory 234 for storing the image data from the fourth transceiver 232. Notably, in order to reduce the transmission time, it is preferred that a high speed transmission is applied between the third and the fourth transceivers 224 and 232, respectively.

[0024] Referring to FIG. 3, the capsule type ~~endoscopy~~endoscope system 200 of the embodiment further comprises a trigger 260, adapted to transmit a signal or an order for triggering the transmission between the third and the fourth transceivers 224 and

232, respectively. In other words, the transmission between the third and the fourth transceivers 224 and 232, respectively, is triggered by the trigger 260. In addition, the trigger 260 is disposed, for example, in the data recorder 220 or the image processor 230. Of course, the trigger 260 can also disposed in the other position of the capsule type ~~endoscopy~~endoscope system 200.

[0025] FIG. 4 is a schematic configuration showing an image data transmission of another preferred capsule type ~~endoscopy~~endoscope system of the present invention. Compared with FIGS 3 and 4, the second embodiment is similar to the first embodiment. The difference is that the fourth transceiver 250 is out of the image processor 230 and coupled thereto.

[0026] In the embodiment, the fourth transceiver 250 serves receiving the image data from the third transceiver 224, and the image data received therefrom are stored in the memory 234 of the image processor 230.

[0027] Accordingly, the capsule type ~~endoscopy~~endoscope system of the present invention comprises following advantages:

1. The capsule type ~~endoscopy~~endoscope system of the present invention displays the image of the digestive tract immediately upon trigger for medical treatments.

2. In the capsule type ~~endoscopy~~endoscope system of the present invention, the image of the digestive tract is transmitted from the third transceiver to the fourth transceiver wirelessly. After the processing of the processor, the image of the digestive tract can be displayed for medical treatment.

[0028] Although the present invention has been described in terms of exemplary embodiments, it is not limited thereto. Rather, the appended claims should be

constructed broadly to include other variants and embodiments of the invention which may be made by those skilled in the field of this art without departing from the scope and range of equivalents of the invention.

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ABSTRACT OF THE DISCLOSURE

A capsule type [[~~endoscopy~~]]endoscope system, comprising a capsule type [[~~endoscopy~~]]endoscope, a data recorder and an image processor, is disclosed. The capsule type [[~~endoscopy~~]]endoscope for catching images of the digestive tract and transforming the image into an image data comprises a first transceiver. The data recorder comprises a second transceiver, a third transceiver and a memory coupled to the second and the third transceivers. The image data are transmitted from the first transceiver to the second transceiver and the image data received by the second transceiver is stored in the memory. In addition, ~~the image data stored in the memory is transmitted from the third transceiver to the image processor~~the image data stored in the memory is downloaded to the image processor by the third transceiver in a wireless manner upon trigger on demand to improve the medical timing efficiency requirement.